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**United States Patent** [19][11] **Patent Number:** **5,106,474****Dickey et al.**[45] **Date of Patent:** **Apr. 21, 1992****[54] ANODE STRUCTURES FOR MAGNETRON SPUTTERING APPARATUS**

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**204/298.21; 204/298.22; 204/298.23**

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**298.11**

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**[57]****ABSTRACT**

An in-line sputtering system with rotating cylindrical magnetrons is fitted with a system of anodes having a large surface area. The surface area is equal to or greater than the surface area of the sputtering chambers' internal walls. The anodes may be grounded, allowed to float electrically, or connected to a separate bias power supply. The anode surfaces are protected from contamination by sputtered material or are designed so the electron collecting surface may be replaced during the sputtering process. The anodes may be equipped with a magnet array for improving electron collecting efficiency.

**34 Claims, 6 Drawing Sheets**